

What is claimed is:

5

1. A pseudo 3D image generating apparatus that generates a pseudo three dimensional image of a subject from a plurality of images captured in various illumination conditions, comprising:

10

an image storing unit that stores the images; and

15

a depth computing unit that computes a pseudo depth value for a plurality of corresponding pixels, each of the stored images containing one of the corresponding pixels, based on an operation between pixel values of the corresponding pixels.

20

2. The pseudo 3D image generating apparatus as claimed in claim 1, wherein

25

said depth computing unit reduces the resolution of the images, and computes the pseudo depth value for the corresponding pixels based on an operation between the pixel values of the corresponding pixels of the resolution-reduced images.

30

3. The pseudo 3D image generating apparatus as claimed in claim 2, wherein

said depth computing unit smoothes the images, and reduces the resolution of the images.

5

4. The pseudo 3D image generating apparatus as claimed in claim 1, wherein

said depth computing unit assigns a discrete
10 depth value to each pixel by comparing one of the difference and the ratio between the pixel values of the corresponding pixels of the images with a threshold value predetermined for each pixel.

15

5. The pseudo 3D image generating apparatus as claimed in claim 1, further comprising an object
20 extracting unit that extracts an object of the subject based on the pseudo depth values assigned to the corresponding pixels, the pseudo depth value being computed by said depth computing unit.

25

6. The pseudo 3D image generating apparatus as claimed in claim 5, wherein

30 said depth computing unit assigns a discrete depth value to each pixel by comparing one of the difference and the ratio between the pixel values of the corresponding pixels with a threshold value predetermined

for each pixel; and

said object extracting unit extracts adjacent pixels of one of the images as the object, the assigned discrete depth values of the adjacent pixels
5 being equal to each other.

10 7. The pseudo 3D image generating apparatus as claimed in claim 6, wherein

said depth computing unit fits a depth function to the object based on the discrete depth values.

15

8. The pseudo 3D image generating apparatus as claimed in claim 6, wherein

20 said depth computing unit smoothes the discrete depth values of the pixels in a predetermined range in one of the entire image, the peripheral portion of the object, and the object.

25

9. A method of generating a pseudo 3D image of a subject from a plurality of images captured in various illumination conditions, comprising the steps of:
30 storing the images; and
computing a pseudo depth value for a plurality of corresponding pixels, each of the stored

images containing one of the corresponding pixels, based on an operation between pixel values of the corresponding pixels.

5

10. The method as claimed in claim 9,
wherein the step of computing a pseudo depth value further
10 comprises the steps of:

reducing the resolution of the images; and
computing the pseudo depth value for the
corresponding pixels based on an operation between the
pixel values of the corresponding pixels of the
15 resolution-reduced images.

20 11. The method as claimed in claim 10,
wherein, when the resolution of the images is reduced, the
images are smoothed.

25

12. The method as claimed in claim 9,
wherein a discrete depth value is assigned to each pixel
by comparing one of the difference and the ratio between
30 the pixel values of the corresponding pixels with a
threshold value predetermined for each pixel.

13. The method as claimed in claim 9,
further comprising the step of extracting an object of the
5 subject based on the pseudo depth values assigned to the
corresponding pixels.

10

14. The method as claimed in claim 13,
wherein

a discrete depth value is assigned to each
pixel by comparing one of the difference and the ratio
15 between the pixel values of the corresponding pixels with
a threshold value predetermined for each pixel in the step
of computing the depth value; and

adjacent pixels of one of the images are
extracted as an object in the step of extracting the
20 object, the assigned discrete depth values of the adjacent
pixels being equal to each other.

25

15. The method as claimed in claim 14,
further comprising the step of fitting a depth function to
the object based on the computed discrete depth values.

30

16. The method as claimed in claim 14,

further comprising the step of smoothing the discrete depth values of the pixels in a predetermined range in one of the entire image, the peripheral portion of the object, and the object.

5

17. A computer program that causes a
10 computer to generate a pseudo 3D image of a subject from a plurality of images captured in various illumination conditions, said computer program comprising the steps of:
storing the images; and
computing a pseudo depth value for a
15 plurality of corresponding pixels, each of the images containing one of the corresponding pixels, based on an operation between pixel values of the corresponding pixels.

20

18. A computer readable recording medium
storing a computer program that causes a computer to
generate a pseudo 3D image of a subject from a plurality
25 of images captured in various illumination conditions, said computer program comprising the steps of:
storing the images; and
computing a pseudo depth value for a
plurality of corresponding pixels, each of the stored
30 images containing one of the corresponding pixels, based on an operation between pixel values of the corresponding pixels.